



Dart Aerospace Ltd.  
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Hawkesbury, ON  
K6A 1K7  
Canada

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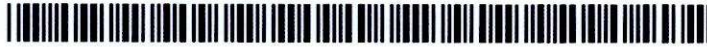
**D119-796-141TRN**  
**Job Sheet 201870**



**Part No:** D119-796-141TRN

**Job Qty:** 1 pcs

**Part Name:** Crosstube Turning Detail



**Part Weight:** 0 lbs

**Status:** New

**Priority:** Medium

**Job Created:** 10/16/19

**Job Tracking No:**

**Due Date:** 10/30/19

**Created By:** Marie Lajeunesse

**Type:** Stock

**Description:**

**Note:** D119-796-141 REV H IPP REV A RQ 14/06/06 VERIFIED BY DD IPP REV:B 16.05.04 AS PER DWG REV.H  
DD VERF:JLM

**Ship Via:**

### Bill of Materials

### Job Routing

| Op No | Operation            | Qty      | Start Date | Due Date | Standard  |         | Workcenter/Supplier   |           | Sign-off               |
|-------|----------------------|----------|------------|----------|-----------|---------|-----------------------|-----------|------------------------|
|       |                      |          |            |          | Setup Hrs | Run Hrs | Workcenter / Supplier | Lead Time |                        |
| 100   | Mori Seiki TL-40 - 1 | 1<br>pcs |            | 10/30/19 | 1.00      | 1.52    | Mori Seiki TL-40 - 1  |           | DAS 66 2019/12/02 9-89 |
| 110   | QC 2                 | 1<br>pcs |            | 10/30/19 | 0.00      | 0.00    | QC 2 - 1              |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 12             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 14             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 17             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 19             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 2              |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 20             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 22             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 23             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 25             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 32             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 33             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 35             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 39             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 4              |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 40             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 44             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 45             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 48             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 49             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 50             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 51             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 52             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 57             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 62             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 63             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 8              |           | DAS 66 2019/12/02 9-89 |
|       |                      |          |            |          |           |         | QC 2 - 66             |           |                        |
|       |                      |          |            |          |           |         | QC 2 - 64             |           |                        |

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|     |                            |          |          |           |                               |                              |
|-----|----------------------------|----------|----------|-----------|-------------------------------|------------------------------|
|     |                            |          |          |           | QC 2 - 65                     |                              |
|     |                            |          |          |           | QC 2 - 5                      |                              |
|     |                            |          |          |           | QC 2 - 71                     |                              |
|     |                            |          |          |           | QC 2 - 73                     |                              |
|     |                            |          |          |           | QC 2 - 69                     |                              |
| 120 | Mori Seiki TL-40 - 1 - B4B | 1<br>pcs | 10/30/19 | 1.00 1.52 | Mori Seiki TL-40 - 1 -<br>B4B | DAS<br>66 2019/12/03<br>9-89 |
| 130 | QC 2                       | 1<br>pcs | 10/30/19 | 0.00 0.00 | QC 2 - 1                      |                              |
|     |                            |          |          |           | QC 2 - 12                     |                              |
|     |                            |          |          |           | QC 2 - 14                     |                              |
|     |                            |          |          |           | QC 2 - 17                     |                              |
|     |                            |          |          |           | QC 2 - 19                     |                              |
|     |                            |          |          |           | QC 2 - 2                      |                              |
|     |                            |          |          |           | QC 2 - 20                     |                              |
|     |                            |          |          |           | QC 2 - 22                     |                              |
|     |                            |          |          |           | QC 2 - 23                     |                              |
|     |                            |          |          |           | QC 2 - 25                     |                              |
|     |                            |          |          |           | QC 2 - 32                     |                              |
|     |                            |          |          |           | QC 2 - 33                     |                              |
|     |                            |          |          |           | QC 2 - 35                     |                              |
|     |                            |          |          |           | QC 2 - 39                     |                              |
|     |                            |          |          |           | QC 2 - 4                      |                              |
|     |                            |          |          |           | QC 2 - 40                     |                              |
|     |                            |          |          |           | QC 2 - 44                     |                              |
|     |                            |          |          |           | QC 2 - 45                     |                              |
|     |                            |          |          |           | QC 2 - 48                     |                              |
|     |                            |          |          |           | QC 2 - 49                     |                              |
|     |                            |          |          |           | QC 2 - 50                     |                              |
|     |                            |          |          |           | QC 2 - 51                     |                              |
|     |                            |          |          |           | QC 2 - 52                     |                              |
|     |                            |          |          |           | QC 2 - 57                     |                              |
|     |                            |          |          |           | QC 2 - 62                     |                              |
|     |                            |          |          |           | QC 2 - 63                     |                              |
|     |                            |          |          |           | QC 2 - 8                      | DAS                          |
|     |                            |          |          |           | QC 2 - 66                     | 66 2019/12/03                |
|     |                            |          |          |           | QC 2 - 64                     | 9-89                         |
|     |                            |          |          |           | QC 2 - 65                     |                              |
|     |                            |          |          |           | QC 2 - 5                      |                              |
|     |                            |          |          |           | QC 2 - 71                     |                              |
|     |                            |          |          |           | QC 2 - 73                     |                              |
|     |                            |          |          |           | QC 2 - 69                     |                              |
| 140 | QC 8                       | 1<br>pcs | 10/30/19 | 0.00 0.00 | QC 8 - 12                     |                              |
|     |                            |          |          |           | QC 8 - 14                     |                              |
|     |                            |          |          |           | QC 8 - 17                     |                              |
|     |                            |          |          |           | QC 8 - 20                     |                              |
|     |                            |          |          |           | QC 8 - 25                     |                              |
|     |                            |          |          |           | QC 8 - 3                      |                              |
|     |                            |          |          |           | QC 8 - 32                     |                              |
|     |                            |          |          |           | QC 8 - 33                     |                              |
|     |                            |          |          |           | QC 8 - 35                     |                              |
|     |                            |          |          |           | QC 8 - 39                     |                              |
|     |                            |          |          |           | QC 8 - 4                      |                              |
|     |                            |          |          |           | QC 8 - 44                     |                              |
|     |                            |          |          |           | QC 8 - 45                     |                              |
|     |                            |          |          |           | QC 8 - 49                     |                              |
|     |                            |          |          |           | QC 8 - 58                     |                              |
|     |                            |          |          |           | QC 8 - 8                      |                              |
|     |                            |          |          |           | QC 8 - 9                      |                              |
|     |                            |          |          |           | QC 8 - 68                     |                              |



|     |                               |          |          |           |                           |               |
|-----|-------------------------------|----------|----------|-----------|---------------------------|---------------|
|     |                               |          |          |           | QC 8 - 67                 |               |
|     |                               |          |          |           | QC 8 - 1 (A)              |               |
|     |                               |          |          |           | QC 8 - 47                 |               |
|     |                               |          |          |           | QC 8 - 40                 |               |
|     |                               |          |          |           | QC 8 - 52                 |               |
|     |                               |          |          |           | QC 8 - 23                 |               |
|     |                               |          |          |           | QC 8 - 57                 | DAS           |
|     |                               |          |          |           | QC 8 - 76                 | 76            |
|     |                               |          |          |           | QC 8 - 61                 | 9-89          |
| 145 | Crosstubes - 2 - B4B          | 1<br>pcs | 10/30/19 | 0.00 0.33 | Crosstubes - 1 - B4B      |               |
|     |                               |          |          |           | Crosstubes - 2 - B4B      | DB 12/9/2019  |
|     |                               |          |          |           | Crosstubes - 3 - B4B      |               |
|     |                               |          |          |           | Crosstubes - 4 - B4B      |               |
| 150 | Handfinish - 1-1 Chemical-B4B | 1<br>pcs | 10/30/19 | 0.00 0.40 | Handfinish - 1 - 1 - B4B  | BEB 19-12-09. |
|     |                               |          |          |           | Handfinish - 1 - 2 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 3 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 4 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 5 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 6 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 7 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 8 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 9 - B4B  |               |
|     |                               |          |          |           | Handfinish - 1 - 10 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 11 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 12 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 13 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 14 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 15 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 16 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 17 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 18 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 19 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 20 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 21 - B4B |               |
|     |                               |          |          |           | Handfinish - 1 - 22 - B4B |               |
| 160 | QC 7                          | 1<br>pcs | 10/30/19 | 0.00 0.00 | QC 7 - 10                 |               |
|     |                               |          |          |           | QC 7 - 13                 |               |
|     |                               |          |          |           | QC 7 - 14                 |               |
|     |                               |          |          |           | QC 7 - 15                 |               |
|     |                               |          |          |           | QC 7 - 17                 |               |
|     |                               |          |          |           | QC 7 - 18                 |               |
|     |                               |          |          |           | QC 7 - 19                 |               |
|     |                               |          |          |           | QC 7 - 2                  |               |
|     |                               |          |          |           | QC 7 - 28                 |               |
|     |                               |          |          |           | QC 7 - 3                  |               |
|     |                               |          |          |           | QC 7 - 30                 |               |
|     |                               |          |          |           | QC 7 - 34                 |               |
|     |                               |          |          |           | QC 7 - 36                 |               |
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|-----|-----------------------------|---|----------|-----------|------------------------|
|     |                             |   |          | QC 7 - 37 |                        |
|     |                             |   |          | QC 7 - 41 |                        |
|     |                             |   |          | QC 7 - 47 | 17-12-10               |
|     |                             |   |          | QC 7 - 48 |                        |
|     |                             |   |          | QC 7 - 51 |                        |
|     |                             |   |          | QC 7 - 58 |                        |
|     |                             |   |          | QC 7 - 59 |                        |
|     |                             |   |          | QC 7 - 60 |                        |
|     |                             |   |          | QC 7 - 9  |                        |
|     |                             |   |          | QC 7 - 68 |                        |
|     |                             |   |          | QC 7 - 50 |                        |
|     |                             |   |          | QC 7 - 67 |                        |
|     |                             |   |          | QC 7 - 40 |                        |
|     |                             |   |          | QC 7 - 24 |                        |
|     |                             |   |          | QC 7 - 43 |                        |
|     |                             |   |          | QC 7 - 61 |                        |
|     |                             |   |          | QC 7 - 81 |                        |
|     |                             |   |          | QC 7 - 76 |                        |
|     |                             |   |          | QC 7 - 79 |                        |
| 170 | Packaging 3-1 - Stock - B4B | 1 | 10/30/19 | 0.00 0.00 | Packaging 3 - 1 - B4B  |
|     | pcs                         |   |          |           | Packaging 3 - 2 - B4B  |
|     |                             |   |          |           | Packaging 3 - 3 - B4B  |
|     |                             |   |          |           | Packaging 3 - 4 - B4B  |
|     |                             |   |          |           | Packaging 3 - 5 - B4B  |
|     |                             |   |          |           | Packaging 3 - 6 - B4B  |
|     |                             |   |          |           | Packaging 3 - 7 - B4B  |
|     |                             |   |          |           | Packaging 3 - 8 - B4B  |
|     |                             |   |          |           | Packaging 3 - 9 - B4B  |
|     |                             |   |          |           | Packaging 3 - 10 - B4B |
|     |                             |   |          |           | Packaging 3 - 11 - B4B |
|     |                             |   |          |           | Packaging 3 - 12 - B4B |
|     |                             |   |          |           | Packaging 3 - 13 - B4B |
|     |                             |   |          |           | Packaging 3 - 14 - B4B |
|     |                             |   |          |           | Packaging 3 - 15 - B4B |
|     |                             |   |          |           | Packaging 3 - 16 - B4B |
|     |                             |   |          |           | Packaging 3 - 17 - B4B |
|     |                             |   |          |           | Packaging 3 - 18 - B4B |
|     |                             |   |          |           | Packaging 3 - 19 - B4B |
|     |                             |   |          |           | Packaging 3 - 20 - B4B |
|     |                             |   |          |           | Packaging 3 - 21 - B4B |
|     |                             |   |          |           | Packaging 3 - 22 - B4B |
|     |                             |   |          |           | Packaging 3 - 23 - B4B |
|     |                             |   |          |           | Packaging 3 - 24 - B4B |
|     |                             |   |          |           | Packaging 3 - 25 - B4B |
|     |                             |   |          |           | Packaging 3 - 26 - B4B |
|     |                             |   |          |           | Packaging 3 - 27 - B4B |
|     |                             |   |          |           | Packaging 3 - 28 - B4B |
|     |                             |   |          |           | Packaging 3 - 29 - B4B |
|     |                             |   |          |           | Packaging 3 - 30 - B4B |
|     |                             |   |          |           | Packaging 3 - 31 - B4B |
|     |                             |   |          |           | Packaging 3 - 32 - B4B |
|     |                             |   |          |           | Packaging 3 - 33 - B4B |
|     |                             |   |          |           | Packaging 3 - 34 - B4B |
|     |                             |   |          |           | Packaging 3 - 35 - B4B |
|     |                             |   |          |           | Packaging 3 - 36 - B4B |
| 180 | QC 21 - FG                  | 1 | 10/30/19 | 0.00 0.00 | QC 21 - FG - 21        |
|     | pcs                         |   |          |           | QC 21 - FG - 70        |
|     |                             |   |          |           | QC 21 - FG - 53        |

Part Op 100 - 1-Fill tube with sand &amp; install plugs on both ends as per Folio FB316 2-Turn first side as per Folio FB316 3-Blend

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Descriptions: transition lines only, \*\*do not sand whole tube\*\*: FOLIO REV: H DWG REV: H \*Use mill bastard file, brush file repeatedly with file card. \*Do not use sandpaper coarser than 320 grit.

110 - (QC2- Inspect parts off machine FAI/FAIB)

120 - 1-Turn second side as per Folio FB316 2-Blend transition lines only, \*\*do not sand whole tube\*\*: 3-Remove sand and plugs 4- scribe batch # and part # as per dwg

130 - (QC2- Inspect parts off machine FAI/FAIB)

140 - (QC8- Inspect parts - second check)

145 - GRIND ONLY TRANSITION LINES SMOOTH LONGITUDE WAY.

150 - 1- handfinish X-TUBE INSIDE AND OUT 2- ALODINE AND ACID ETCH X-TUBE INSIDE AND OUT. USE RED SCOTCH BRITE

160 - (QC7-Inspect Chemical Conversion Coat)

170 - (Identify as per dwg & Stock Location: \_\_\_\_\_) LOCATION : LG014

180 - (QC21- Final Inspection - Work Order Release)

### Job BOM

| Part / Item | Component Name     | Quantity     | Operation                | Container |
|-------------|--------------------|--------------|--------------------------|-----------|
| D6024-103   | Crosstube Material | 1 pcs (1 ea) | 100-Mori Seiki TL-40 - 1 | S235857   |

### Job Allocations

| Operation                | Component Part | Required | Inventory | Allocated |
|--------------------------|----------------|----------|-----------|-----------|
| 100-Mori Seiki TL-40 - 1 | D6024-103      | 1        | 0         | 0         |

### Part Specifications

Specifications could not be found.



Container No: S236621



Part: D119-796-141TRN

Job No: 201870

Serial No/Batch: S236621

Revision: H

Inspector:

Exp Date:

Instructions:

Dart Aerospace Ltd.  
1270 Aberdeen Street  
Hawkesbury, ON K6A 1K7  
CANADA  
TEL.: 1 813 632-5200  
Email: sales@dartaero.com  
www.dartaerospace.com

Date: 12/02/19

Plex 10/16/19 10:07 AM Dart.lajeunesse.marie

④

|                                                         |                                     |
|---------------------------------------------------------|-------------------------------------|
| <b>DART AEROSPACE LTD</b>                               | <b>Work Order:</b> 201870           |
| <b>Description:</b> Crosstube Assembly (AW119 MKII Fwd) | <b>Part Number:</b> D119-796-141TRN |
| <b>Inspection Dwg:</b> D119-796-141 <b>Rev:</b> H       | <b>Page 1 of 2</b>                  |

### FIRST ARTICLE INSPECTION CHECKLIST

|        | Inspection Sheet<br>Drawing Dimension | Tolerance     | Actual<br>Dimension | Accept | Reject | Method of<br>Inspection | Comments |
|--------|---------------------------------------|---------------|---------------------|--------|--------|-------------------------|----------|
| SIDE A | 6.00                                  | +/-0.030      | 6.00                | ✓      |        | CNC-08                  |          |
|        | 2.516                                 | +/-0.005      | 2.521               | ✓      |        | CNC-04                  |          |
|        | 2.333                                 | +0.005/-0.000 | 2.335               | ✓      |        | ↓                       |          |
|        | 2.333                                 | +0.005/-0.000 | 2.338               | ✓      |        |                         |          |
|        | 2.408                                 | +0.005/-0.000 | 2.413               | ✓      |        |                         |          |
|        | 2.502                                 | +0.005/-0.000 | 2.507               | ✓      |        |                         |          |
|        | 2.596                                 | +0.005/-0.000 | 2.600               | ✓      |        | CNC-04                  |          |
|        | 2.596                                 | +0.005/-0.000 | 2.601               | ✓      |        | "                       |          |
|        |                                       |               |                     |        |        |                         |          |
|        |                                       |               |                     |        |        |                         |          |
| SIDE B | 6.00                                  | +/-0.030      | 6.00                | ✓      |        | CNC-08                  |          |
|        | 2.516                                 | +/-0.005      | 5.521               | ✓      |        | CNC-04                  |          |
|        | 2.333                                 | +0.005/-0.000 | 2.336               | ✓      |        | ↓                       |          |
|        | 2.333                                 | +0.005/-0.000 | 2.338               | ✓      |        |                         |          |
|        | 2.408                                 | +0.005/-0.000 | 2.413               | ✓      |        |                         |          |
|        | 2.502                                 | +0.005/-0.000 | 2.507               | ✓      |        |                         |          |
|        | 2.596                                 | +0.005/-0.000 | 2.600               | ✓      |        | CNC-04                  |          |
|        | 2.596                                 | +0.005/-0.000 | 2.601               | ✓      |        | "                       |          |
|        |                                       |               |                     |        |        |                         |          |
|        |                                       |               |                     |        |        |                         |          |
|        | 102.26                                | +/-0.020      | 102.26              | ✓      |        | Tape                    |          |

CNC  
27  
RR-11

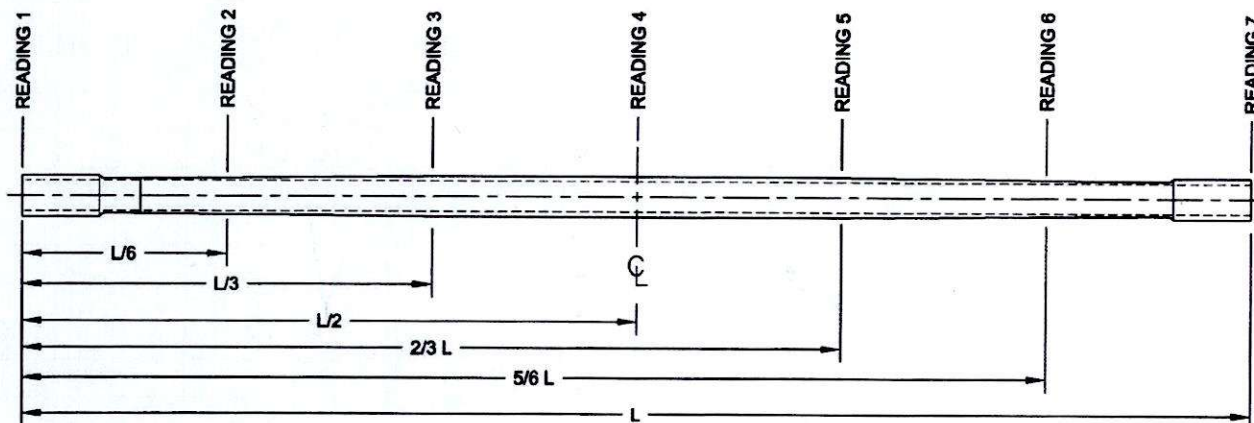
CNC  
28  
RR-11



4

|                                                         |                                     |
|---------------------------------------------------------|-------------------------------------|
| <b>DART AEROSPACE LTD</b>                               | <b>Work Order:</b> 201870           |
| <b>Description:</b> Crosstube Assembly (AW119 MKII Fwd) | <b>Part Number:</b> D119-796-141TRN |
| <b>Inspection Dwg:</b> D119-796-141 Rev: H              | <b>Page 2 of 2</b>                  |

### WALL THICKNESS MEASUREMENT



| Location                | WALL THICKNESS MEASUREMENT (IN) |      |      |      | Deviation<br>$\Delta w$<br>(max-min) | TOLERANCE |
|-------------------------|---------------------------------|------|------|------|--------------------------------------|-----------|
|                         | w1                              | w2   | w3   | w4   |                                      |           |
| READING 1<br>L = 0"     | .259                            | .257 | .254 | .256 | .005                                 | 0.030"    |
| READING 2<br>L = 17.043 | .174                            | .179 | .184 | .178 | .010                                 |           |
| READING 3<br>L = 34.087 | .264                            | .266 | .271 | .268 | .007                                 | 0.063"    |
| READING 4<br>L = 51.13  | .307                            | .307 | .308 | .300 | .008                                 |           |
| READING 5<br>L = 68.173 | .267                            | .273 | .270 | .260 | .013                                 |           |
| READING 6<br>L = 85.217 | .174                            | .180 | .185 | .177 | .011                                 | 0.030"    |
| READING 7<br>L = 102.26 | .256                            | .258 | .261 | .257 | .005                                 |           |

#### Calibration Result

Actual Block Thickness: 100-300

Sitescan 250 Measured Thickness: 100-300

DAS  
76  
9-89

|                     |            |
|---------------------|------------|
| <b>Measured by:</b> | DAS<br>66  |
| <b>Date:</b>        | 2019/12/03 |

|                    |                   |
|--------------------|-------------------|
| <b>Audited by:</b> | DAS<br>76<br>9-89 |
| <b>Date:</b>       | 12/7/2019         |

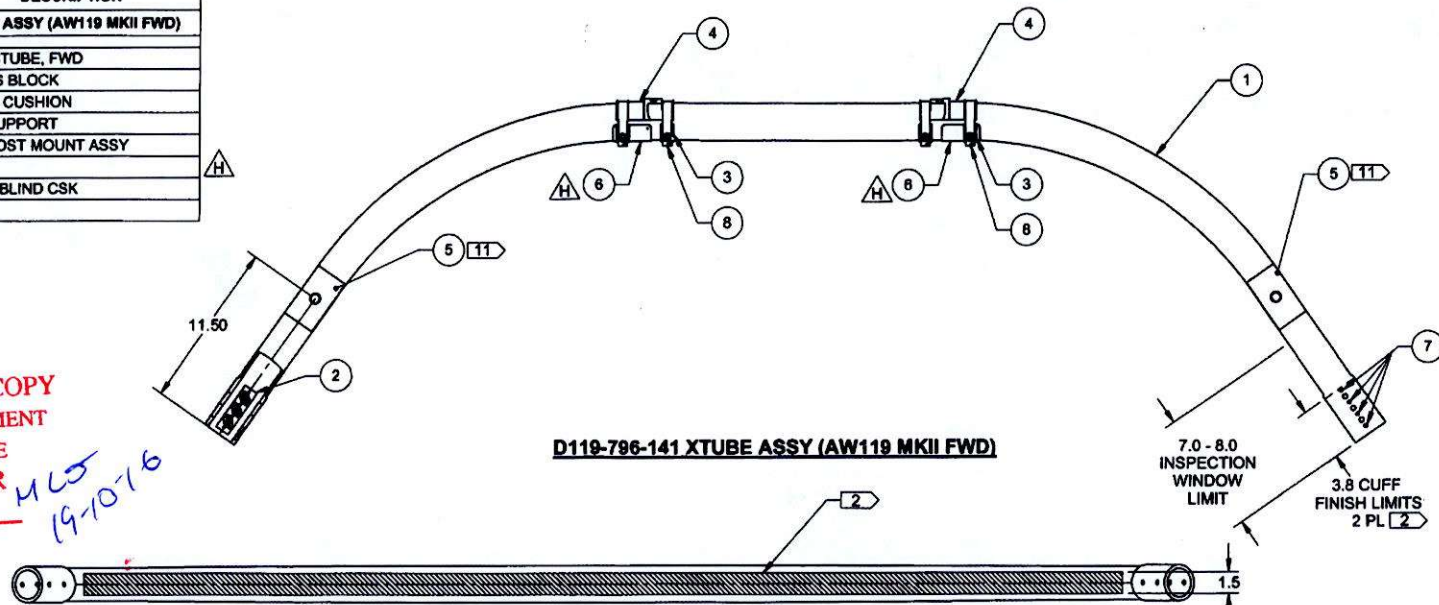
|                              |  |
|------------------------------|--|
| <b>Preliminary Approval:</b> |  |
| <b>Date:</b>                 |  |

| Rev | Date     | Change                                 | Revised by | Approved |
|-----|----------|----------------------------------------|------------|----------|
| A   | 15.04.14 | New Issue (P/O D119-796-101)           | KJ         |          |
| B   | 15.05.14 | Tolerances revised per Dwg Rev G       | KJ         |          |
| C   | 16.05.27 | Dwg Rev updated                        | KJ         |          |
| D   | 16.09.13 | Tolerance revised for Reading 3, 6 & 7 | KJ         |          |



| ITEM | QTY | P/N             | DESCRIPTION                 |
|------|-----|-----------------|-----------------------------|
|      | X   | D119-796-141    | XTUBE ASSY (AW119 MKII FWD) |
| 1    | 1   | D119-796-141BND | CROSSTUBE, FWD              |
| 2    | 4   | D2873-043       | RADIUS BLOCK                |
| 3    | 4   | D5123-3         | CLAMP CUSHION               |
| 4    | 2   | D5124-1         | FWD SUPPORT                 |
| 5    | 2   | D5152-041       | FWD POST MOUNT ASSY         |
| 6    | 2   | D5305-1         | SHIM                        |
| 7    | 16  | CR3212-4-08     | RIVET, BLIND CSK            |
| 8    | 4   | MS21920-24      | CLAMP                       |

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WITHOUT NOTICE  
WORK ORDER  
NO. 201870 MLO  
19-10-16



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2015-11-04  
EW 15-642

#### NOTES:

- 1) MATERIAL: N/A
- 2) FINISH: APPLY MATTE CLEAR COAT PER QSI 005 4.2  
MASK D5124-1 FWD SUPPORTS, D5305-1 SHIMS AS WELL AS UNDERSIDE OF CROSSTUBE AS SHOWN (B3-1, HATCHED AREA),  
PAINT OUTSIDE PER DART QSI 005 4.2 AFTER APPLYING CLEAR COAT  
DO NOT APPLY FINISH (PAINT OR CLEAR COAT) TO CUFFS IN LOCATION SHOWN, MASK PRIOR TO FINISHING
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: N/A
- 6) IDENTIFICATION: IDENTIFY USING PART NUMBER "D119-796-141" AND BATCH NUMBER ON INSIDE OF CUFF PER QSI 044 6.4
- 7) WEIGHT: 18.54 lbs
- 8) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE.  
THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS.  
DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 9) PRIOR TO FINISHING, ABRASE MATING SURFACES OF D5124-1 FWD SUPPORTS AND CROSSTUBE WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. APPLY A 0.1 MIN THK LAYER OF PROSEAL 890 ON THE INSIDE CONCAVE SURFACE OF THE D5124-1 FWD SUPPORTS AND INSTALL AT AN 8.4" OFFSET FROM THE CROSSTUBE BENDING PLANE. INSTALL THE MS21920-24 CLAMPS AND D5123-3 CLAMP CUSHIONS WHILE WET.
- 10) TORQUE MS21920 CLAMPS 80 - 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY, THE NUT IS FACING AFT AND HAS NOT BOTTOMED-OUT AFTER TORQUING. PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.
- 11) PRIOR TO FINISHING, ABRASE MATING SURFACES OF CROSSTUBE AND D5152-041 WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. INSTALL D5152-041 WITH LAYER OF PROSEAL 890 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. LOCATE D5152-041 USING TOOL DT10089.
- 12) PRIOR TO FINISHING, ABRASE MATING SURFACES OF CROSSTUBE AND D5305-1 SHIM WITH SCOTCH BRITE 7447 RED AND REMOVE RESIDUE WITH DUPONT 4105S WASH'N'WIPE DEGREASER. INSTALL D5305-1 SHIM WITH LAYER OF PROSEAL 890 ON INSIDE CONCAVE SURFACE, 0.1 MIN THK. USE ADDITIONAL TEMPORARY MS21920-24 CLAMP TO APPLY CLAMPING PRESSURE FOR 72 HOURS.

| REV.       | DESCRIPTION                                                                                                                                                                    | BY   | DATE     |
|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------|
| H          | ADD D5305-1 SHIM, D6024-103 WAS D6005-103, D5124-1 NOW INSTALLED ON PRIMER                                                                                                     | AP   | 15.10.13 |
| G          | FINISHING ORDER ADJUSTED, CR3212-4-08 WAS -07, CUFF DIA TOLERANCE INCREASED TO +/- 0.005                                                                                       | AP   | 15.04.24 |
| F          | REMOVED PRIME/ PAINT ON CUFFS, 2.516 WAS 2.500 (C8-5)                                                                                                                          | AP   | 15.02.03 |
| E          | D5152-041 FWD STEP POST ASSY WAS D5150-1 STEP POST, SCOTCH BRITE 7447 RED WAS 180 GRIT SANDPAPER, ANGLE (B7-2) DIMENSIONED FROM NEW DATUM                                      | DB   | 15.01.15 |
| D          | ADD D5150-1 STEP POST (2X), MOVED INSPECTION WINDOW DETAIL TO SHEET 1, MODIFIED NOTES ON SHT 1 & 2                                                                             | DB   | 14.11.25 |
| C          | CR3212-4-07 RIVETS WERE CR3212-4-09, 7.5 DEG CUFF ANGLE OFFSET REMOVED (SHT 3), CUFF DIAMETER ON D119-796-141TRN REDUCED TO 2.500, ADDED INSPECTION WINDOW (B7-3), ADDED SHT 4 | AP   | 14.10.23 |
| B          | ADDED D2873-043 RADIUS BLOCK, CR3212-4-09 RIVETS, ADDED SKIDTUBE REFERENCE FOR LOCATING CUFF HOLES, RE-ORGANIZED NOTES AND REMOVED REDUNDANT INFORMATION                       | AP   | 14.09.02 |
| A          | NEW ISSUE                                                                                                                                                                      | AP   | 14.08.09 |
| DESIGN     | AP                                                                                                                                                                             | DATE |          |
| DRAWN      | AP                                                                                                                                                                             |      |          |
| CHECKED    | AJS                                                                                                                                                                            |      |          |
| MFG. APPR. | JLM                                                                                                                                                                            |      |          |
| APPROVED   | WM                                                                                                                                                                             |      |          |
| DE APPR.   | DS                                                                                                                                                                             |      |          |
| DATE       | 15.10.13                                                                                                                                                                       |      |          |

**DART AEROSPACE LTD**  
HAWKESBURY, ONTARIO, CANADA

DRAWING NO.  
**D119-796-141**

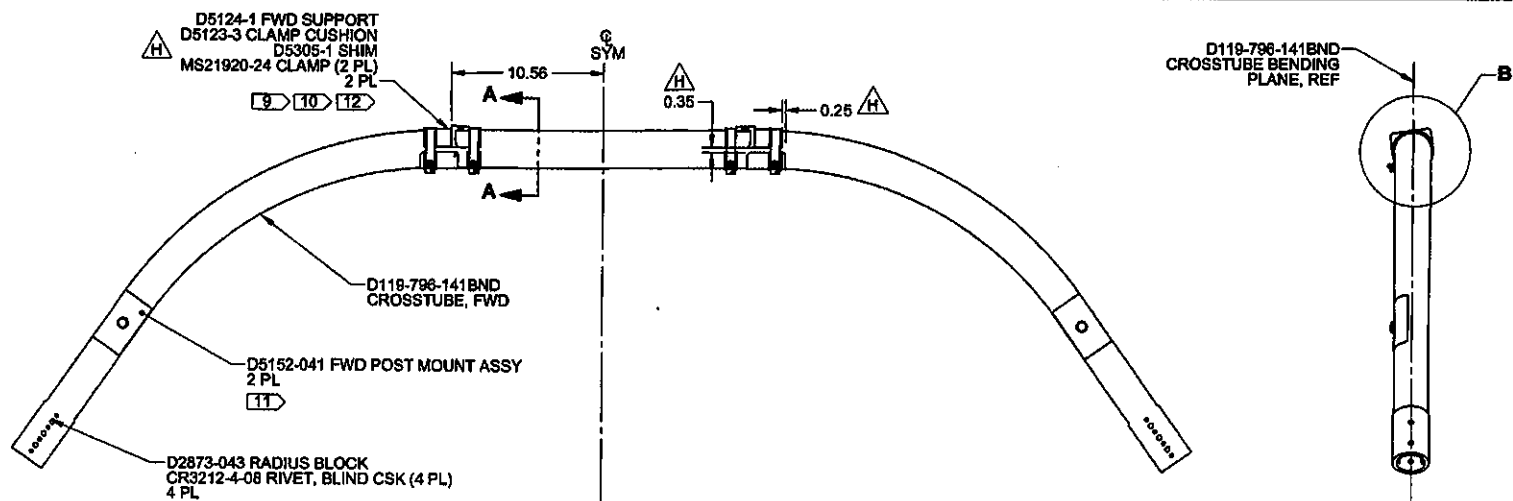
REV. H  
SHEET 1 OF 6

TITLE  
**XTUBE ASSY (AW119 MKII FWD)**

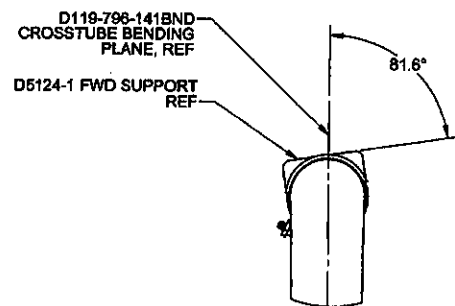
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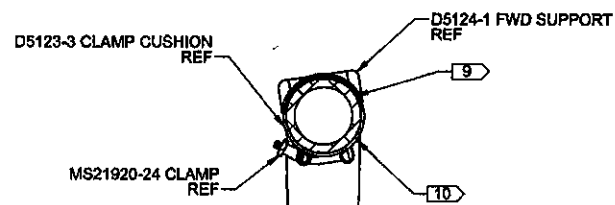




**D119-796-141 XTUBE ASSY (AW119 MKII FWD)**



**DETAIL B**  
SCALE 2X

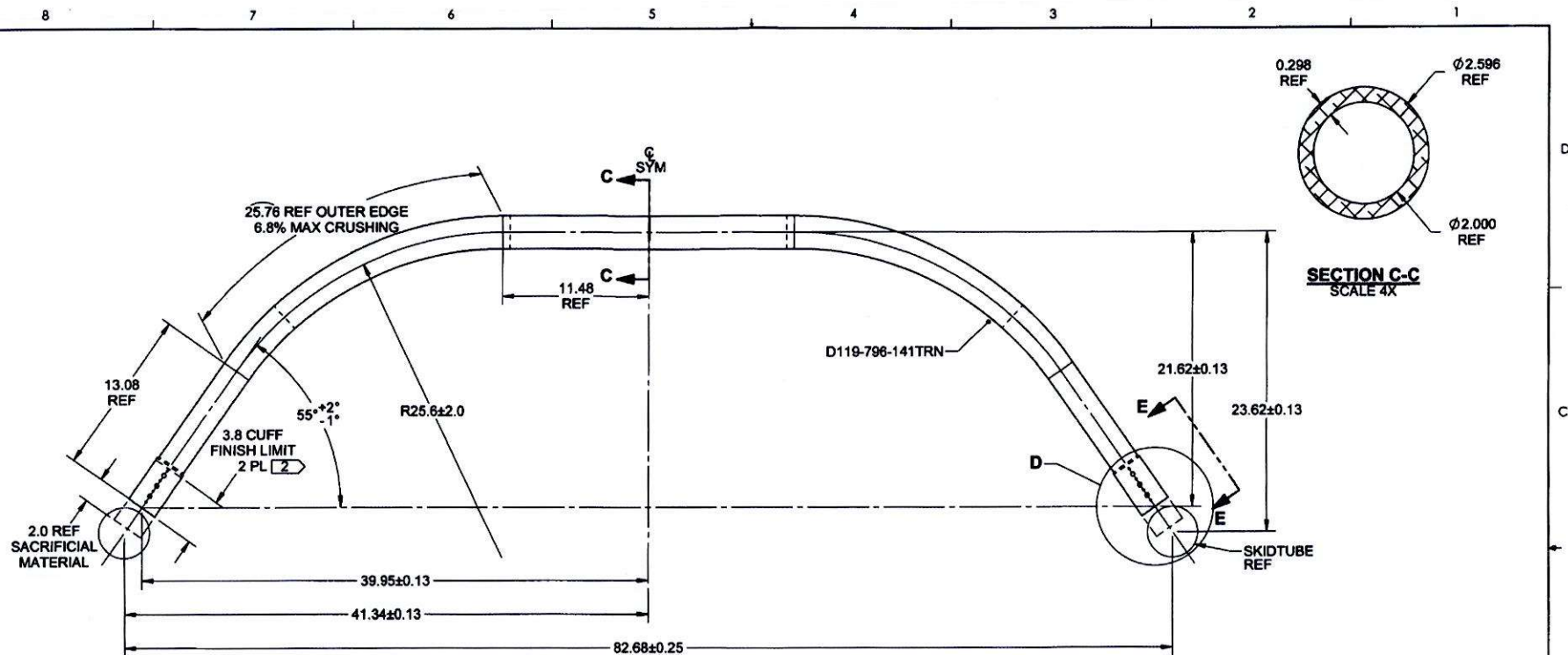


**SECTION A-A**  
SCALE 2X

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|            |          |                                                                                                                                                                                                                                                                                        |              |
|------------|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                               |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                                        |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                                            | REV. H       |
| MFG. APPR. | JLM      | <b>D119-796-141</b>                                                                                                                                                                                                                                                                    | SHEET 2 OF 8 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                                  | SCALE        |
| DE APPR.   | DS       | <b>XTUBE ASSY (AW119 MKII FWD)</b>                                                                                                                                                                                                                                                     | NTS          |
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**D119-796-141BND CROSSTUBE, FWD** [9]  
BENDING AND DRILLING DETAIL

**NOTES:**

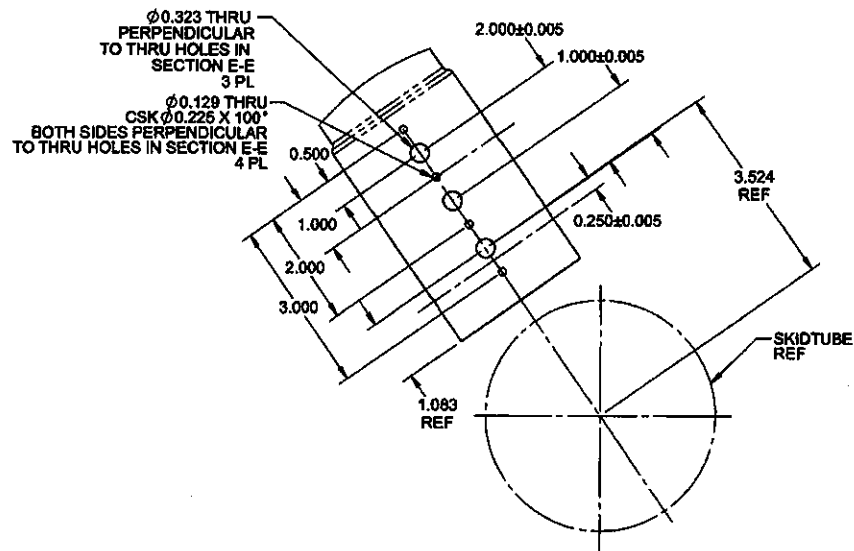
- 1) MATERIAL: MADE FROM D119-796-141TRN
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
DO NOT APPLY PRIMER TO CUFFS IN LOCATION SHOWN, MASK PRIOR TO FINISHING
- 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
- 6) IDENTIFICATION: NONE
- 7) WEIGHT: 16.70 lbs
- 8) PART IS SYMMETRICAL ABOUT CENTERLINE
- 9) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6.8% BASED ON OD.
- 10) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038
- 11) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM DEFECTS SUCH AS SCRATCHES, NICKS OR DENTS. DEFECTS UP TO 0.005 MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.

**RELEASED**  
2015-11-04

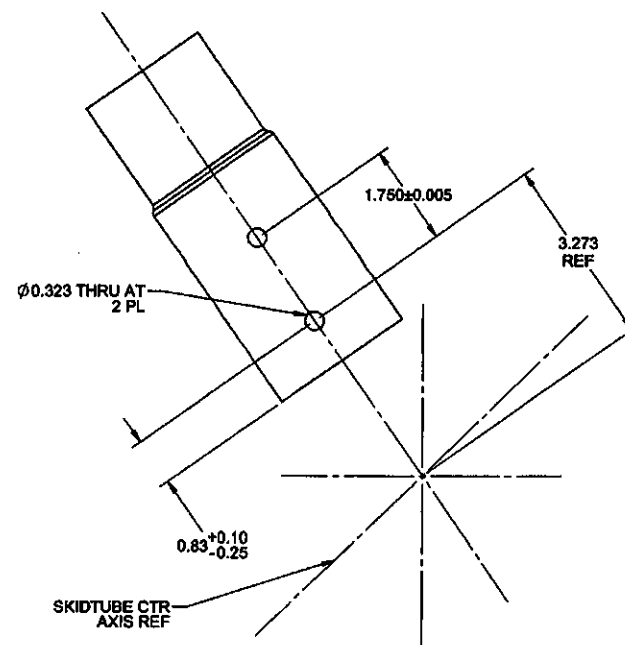
APPROVED

|                                                                                                                                                                                                                      |          |                                        |              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------------------------------------|--------------|
| DESIGN                                                                                                                                                                                                               | AP       | <b>DART AEROSPACE LTD</b>              |              |
| DRAWN                                                                                                                                                                                                                | AP       | HAWKESBURY, ONTARIO, CANADA            |              |
| CHECKED                                                                                                                                                                                                              | AJS      | DRAWING NO.                            | REV. H       |
| MFG. APPR.                                                                                                                                                                                                           | JLM      | <b>D119-796-141</b>                    | SHEET 3 OF 6 |
| APPROVED                                                                                                                                                                                                             | WM       | TITLE                                  | SCALE        |
| DE APPR.                                                                                                                                                                                                             | DS       | <b>XTUBE ASSY (AW119 MKII FWD)</b>     | NTS          |
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VIEW D  
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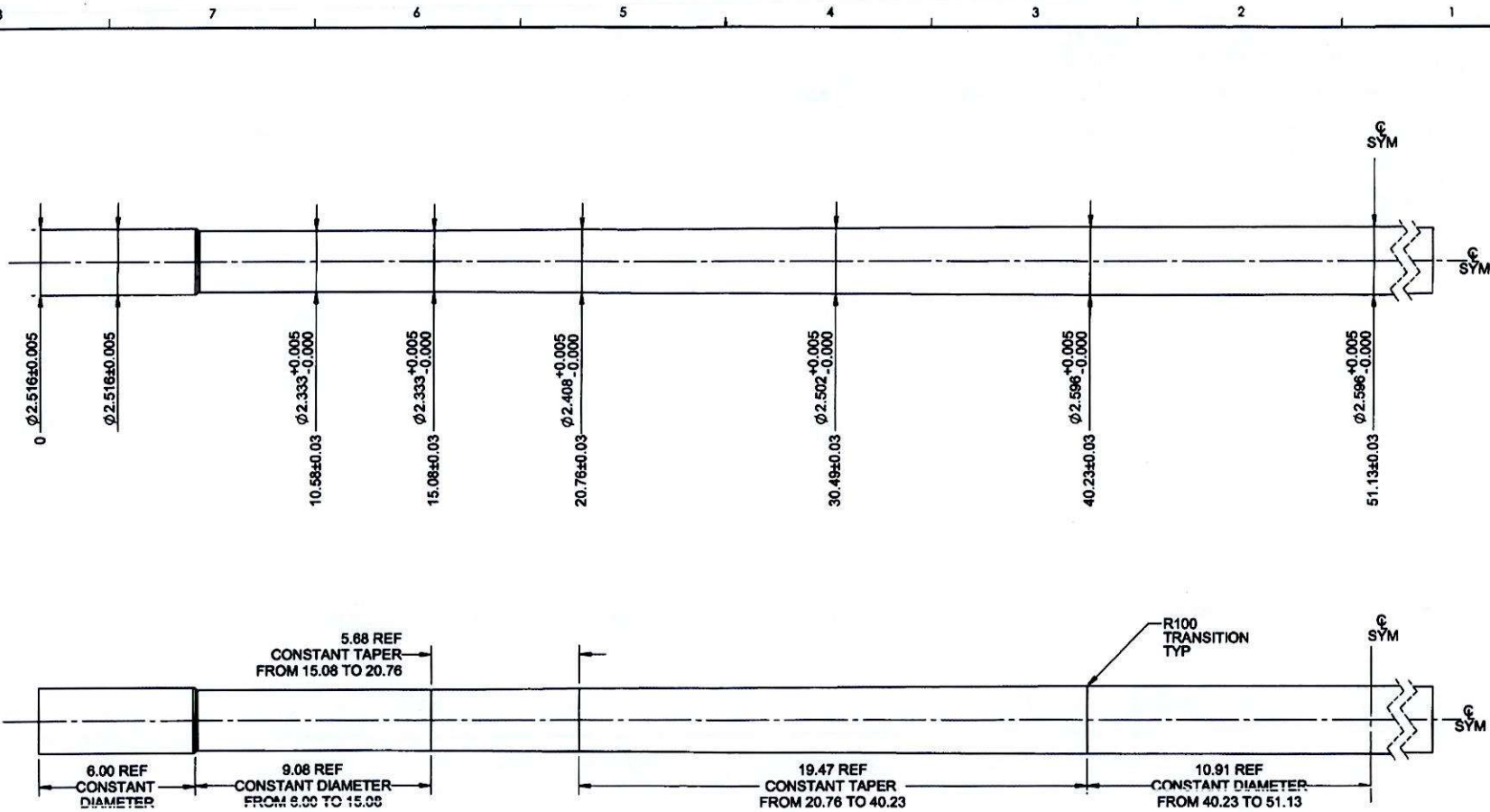


VIEW E-E  
SCALE 2X

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|            |          |                                                                                                                                                                                                                                                                                               |              |
|------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                                      |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                                               |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                                                   | REV. H       |
| MFG. APPR. | JLM      | D119-796-141                                                                                                                                                                                                                                                                                  | SHEET 4 OF 8 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                                         | SCALE        |
| DE APPR.   | DS       | XTUBE ASSY (AW119 MKII FWD)                                                                                                                                                                                                                                                                   | NTS          |
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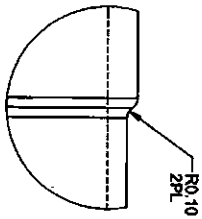
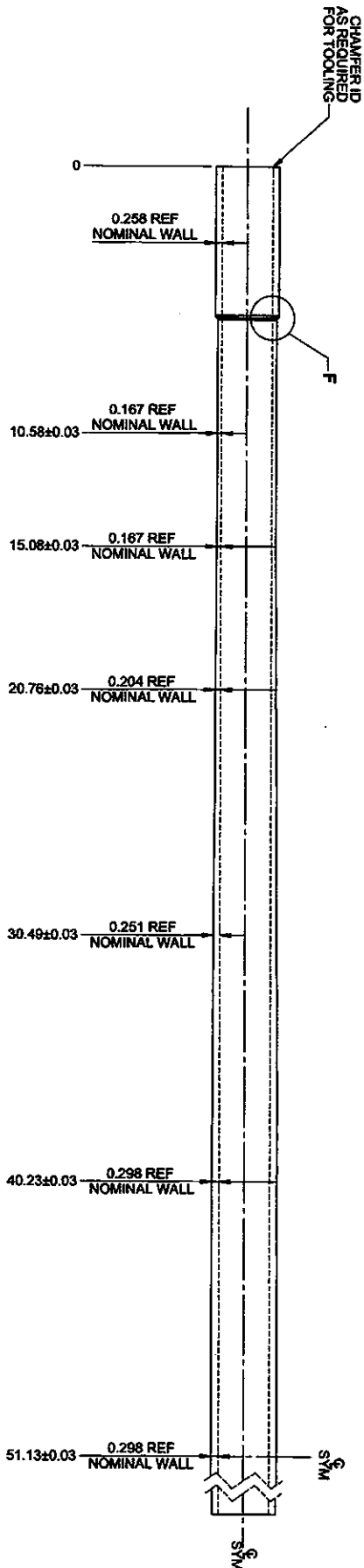
**D119-796-141TRN CROSSTUBE, FWD**

- NOTES:**
- 1) MATERIAL: MANUFACTURE FROM D6024-103 (PREFERRED) OR D6005-103  
FINISHED LENGTH = 102.26  $\pm 0.020$  (BEFORE BENDING/TRIMMING)
  - 2) FINISH: NONE
  - 3) TOLERANCES: PER DART QSI 018 UNLESS OTHERWISE NOTED
  - 4) UNITS: INCHES UNLESS OTHERWISE NOTED
  - 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX
  - 6) IDENTIFICATION: NONE
  - 7) WEIGHT: 16.70 lbs
  - 8) PART IS SYMMETRICAL ABOUT CENTERLINE

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2015-11-04

|            |          |                                                                                                                                                                                                                                                                               |              |
|------------|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| DESIGN     | AP       | <b>DART AEROSPACE LTD</b><br>HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                                      |              |
| DRAWN      | AP       |                                                                                                                                                                                                                                                                               |              |
| CHECKED    | AJS      | DRAWING NO.                                                                                                                                                                                                                                                                   | REV. H       |
| MFG. APPR. | JLM      | D119-796-141                                                                                                                                                                                                                                                                  | SHEET 5 OF 6 |
| APPROVED   | WM       | TITLE                                                                                                                                                                                                                                                                         | SCALE        |
| DE APPR.   | DS       | XTUBE ASSY (AW119 MKII FWD)                                                                                                                                                                                                                                                   | NTS          |
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DETAIL F  
SCALE 2X

D119-796-141TRN CROSTUBE FWD  
SUPPLEMENTAL VIEW: NOMINAL WALL THICKNESS

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2015-11-04

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|            |          |                                                                                                                                                                                                                                |
|------------|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DESIGN     | AP       | DART AEROSPACE LTD                                                                                                                                                                                                             |
| DRAWN      | AP       | HAWKESBURY, ONTARIO, CANADA                                                                                                                                                                                                    |
| CHECKED    | AJS      |                                                                                                                                                                                                                                |
| MFG. APPR. | JLM      | REV. H                                                                                                                                                                                                                         |
| APPROVED   | WM       | D119-796-141                                                                                                                                                                                                                   |
| DATE       | 15.10.13 | SHEET 6 OF 8                                                                                                                                                                                                                   |
|            |          | SCALE                                                                                                                                                                                                                          |
|            |          | NTS                                                                                                                                                                                                                            |
|            |          | XTUBE ASSY (AW119 MKII FWD)                                                                                                                                                                                                    |
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Entered: \_\_\_\_\_ Date: \_\_\_\_\_



## WORK ORDER NON-CONFORMANCE / ROUTE UPDATE

NCR No. \_\_\_\_\_

Route update only ☐

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                        |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------|--|
| Job: _____<br><br>Part No. _____                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | <b>DISPOSITION</b><br><br>Rework <input type="checkbox"/><br>Scrap <input type="checkbox"/><br>Use-as-is <input type="checkbox"/> | <b>DEPARTMENT/PROCESS</b><br><br><div style="display: flex; justify-content: space-between;"> <div>           Skid-tube <input type="checkbox"/><br/>           Machining <input type="checkbox"/><br/>           Large Fab <input type="checkbox"/> </div> <div>           Cross tube <input type="checkbox"/><br/>           Small Fab <input type="checkbox"/><br/>           Finishing <input type="checkbox"/> </div> <div>           Eng. (Non-AW) <input type="checkbox"/><br/>           Prod. Eng. Coord. <input type="checkbox"/><br/>           Rec/Store/Packaging <input type="checkbox"/> </div> <div>           Engineering <input type="checkbox"/><br/>           Water Jet <input type="checkbox"/><br/>           Supplier <input type="checkbox"/><br/>           Quality <input type="checkbox"/> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |                        |  |
| Date :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Sequence #:                                                                                                                       | QTY Affected :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |  | MRB (QS1042)           |  |
| Description Work Order Deviation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                   | Disposition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  | Completed By           |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | Lead hand / Supervisor |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  | QC / QA Coordinator    |  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                        |  |
| <b>Root Cause</b><br><br><div style="display: flex; flex-direction: column;"> <div>Operator <input type="checkbox"/></div> <div>Manufacturing Process <input type="checkbox"/></div> <div>Equip/Tooling <input type="checkbox"/></div> <div>Handling/Presservation <input type="checkbox"/></div> <div>Material <input type="checkbox"/></div> <div>Product Improvement <input type="checkbox"/></div> <div>Process Improvement <input type="checkbox"/></div> <div>Human Factors <input type="checkbox"/></div> </div> |                                                                                                                                   | <b>FAULT CATEGORY</b><br><br><div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%;"> <input type="checkbox"/> Pressure/Forced<br/> <input type="checkbox"/> Bending<br/> <input type="checkbox"/> Crushing<br/> <input type="checkbox"/> Cracks<br/> <input type="checkbox"/> Crimp/Kink/Ripple/Wave/Twist<br/> <input type="checkbox"/> Marks/Chatter<br/> <input type="checkbox"/> Mislabeled         </div> <div style="width: 50%;"> <input type="checkbox"/> Contamination<br/> <input type="checkbox"/> Misaligned/off center<br/> <input type="checkbox"/> BOM/Route<br/> <input type="checkbox"/> Broken/Damage/Defect<br/> <input type="checkbox"/> Incomplete/Unclear Instructions<br/> <input type="checkbox"/> Drill Holes<br/> <input type="checkbox"/> Fit/Function         </div> <div style="width: 50%;"> <input type="checkbox"/> Power Loss/Surge<br/> <input type="checkbox"/> Folio/Program<br/> <input type="checkbox"/> Grain Direction<br/> <input type="checkbox"/> Weld<br/> <input type="checkbox"/> Wrong Stock Pulled<br/> <input type="checkbox"/> Out of Sequence<br/> <input type="checkbox"/> Off-set/Set-up         </div> <div style="width: 50%;"> <input type="checkbox"/> Positioned Wrong<br/> <input type="checkbox"/> Outside Tolerance<br/> <input type="checkbox"/> Drawing<br/> <input type="checkbox"/> Finish<br/> <input type="checkbox"/> Part Lost/Missing<br/> <input type="checkbox"/> Misread         </div> </div> |  |                        |  |
| Other/Details:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |  |                        |  |